Value Engineering
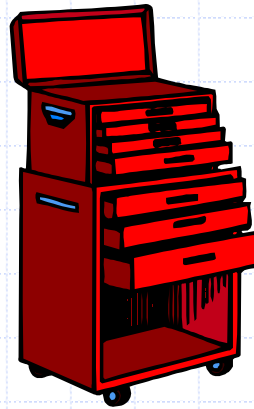## How DOTs use this valuable tool in project development
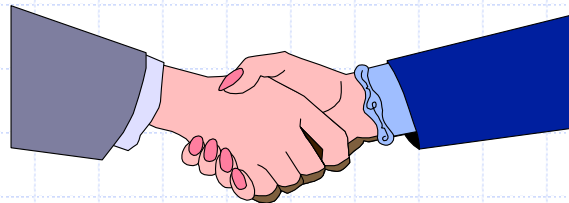
What is it?

When is it used?

How do we use it?

What is Value Engineering?

➢ Value Engineering is a tool we use in project development

➢ Builds consensus with partners

What is Value Engineering?

➢ A formal process that breaks components of a project into functions

➢ A team of experts identifies solutions that will satisfy the functions

➢ 80% of a project's cost can be found in 20% of the items

Value Engineering is:

➢ Systematic problem solving process

➢ Multi-discipline team approach

➢ Life-cycle cost oriented

➢ Value oriented (measurement of scope performance/project costs)

➢ Function-based analysis

➢ Free of normal design restrictions

➢ A proven management technique

Value Engineering is not:

- ➢ A Design Review
  - • It is not intended to correct omissions in the design, nor to review calculations made by the designer.

- ➢ A Cost Cutting Process
  - • It does not cut cost by sacrificing needed quality, reliability, or performance.
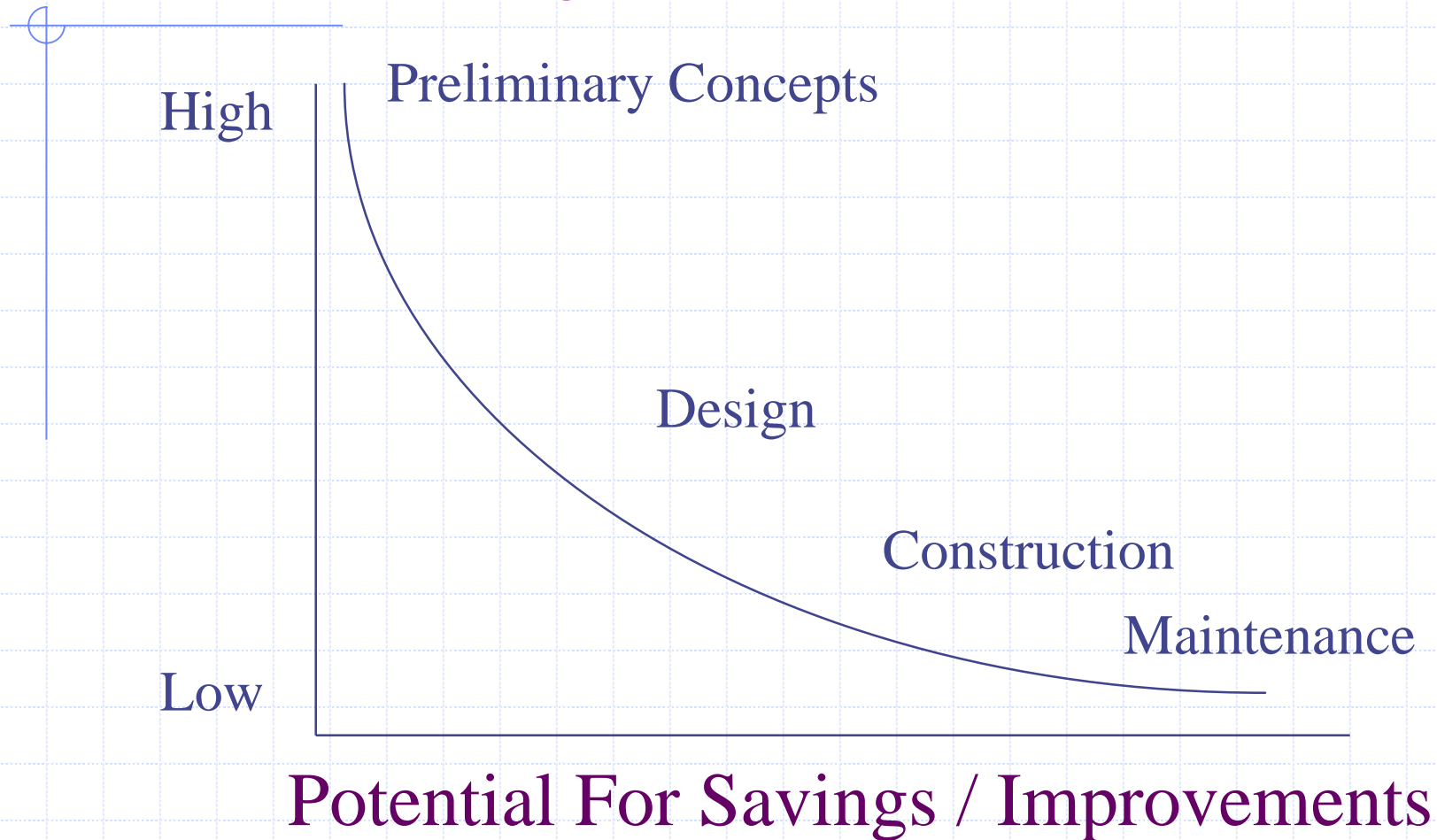
- ➢ Routinely Done on all Designs
  - • It is not a part of the normal design process, but a formal cost and function analysis.
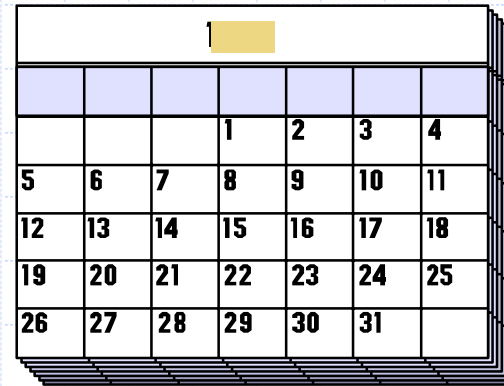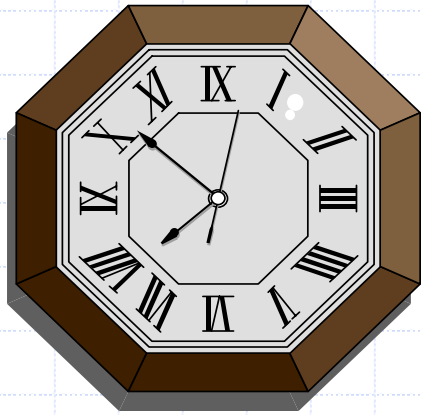
What Value Analysis Can Do

- Focus on the "big picture"
- Improve decision making
- Develop realistic budgets
- Ensure required functions are addressed
- Enhance understanding of total project
- Challenge paradigms
- Identify and remove unnecessary costs
- Accelerate the design process
- Encourage cross-discipline communication

Opportunity Curve
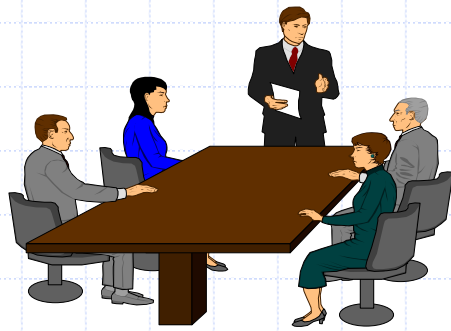
High   Preliminary Concepts

Design

Construction

Maintenance

Low

Potential For Savings / Improvements

When to Perform a VE Study

➢ Concept stage (scoping)

➢ Schematic design stage (beginning PS&E)
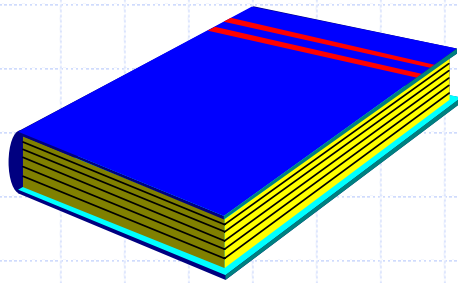
➢ 20-30 percent development stage

Value Engineering Team

> We start with a small group of experts in the required disciplines (design, bridge, construction, environmental, maintenance, traffic)

> Then we add partners from outside DOT (cities, counties, other agencies, outside funding sources, permitting agencies)
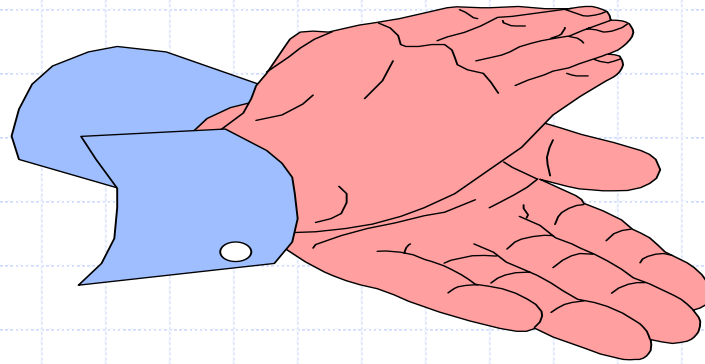
VE Project Selection

➢ 23 CFR Part 627 requires VE on all Federal-Aid (NHS) projects of $25 million or more

➢ Types of projects that can benefit from VE:

- complex projects
- interchanges
- major structures
- new alignments

- extensive traffic control
- special processes/procedures
- unusually expensive

Value Engineering Success

➢ Has not necessarily come by changing the scope or design

➢ Has come from removing constraints or drivers often set by our partners

Phases of the VE Process

➢ Investigation Phase

- Investigate the background information, technical input reports, field data, function analysis, and team focus and objectives.

➢ Speculation Phase

- Be creative and brainstorm alternative proposals and solutions.

Phases of the VE Process

➢ Evaluation phase

- Analyze design alternatives, technical processes, life cycle costs, documentation of logic, and rationale.

➢ Development phase

- Develop technical and economic supporting data to prove the feasibility of the desirable concepts.
- Develop team recommendations. Both long and short term.

Phases of the VE Process

➢ **Presentation Phase**

- Present the recommendations of the VE team in an oral presentation to the Design Team and in a written report and workbook.

➢ **Implementation Phase**

- The Design Team then evaluates the VE Team's recommendations and implements those that are acceptable to them.

Phases of the VE Process

➢ Audit Phase

- Performance measures of the recommendations are compiled and reported to FHWA.

Value Engineering Tools

➤ Functional Analysis
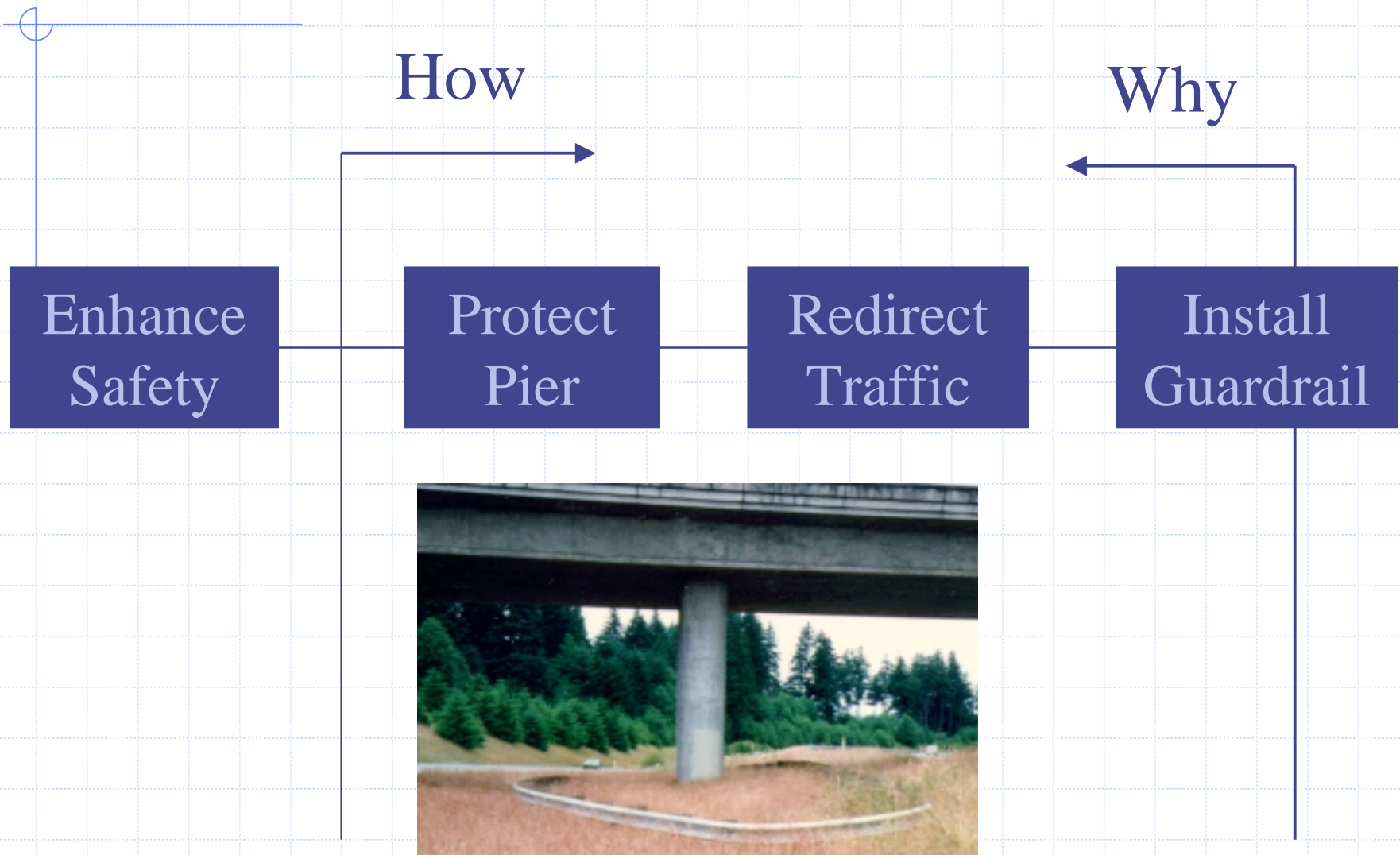
➤ Feasibility

➤ Evaluation Matrix

How Do We Use Value Engineering?

Guardrail around a bridge pier

F.A.S.T. Functional Analysis System Technique

How

Why

| Enhance Safety | Protect Pier | Redirect Traffic | Install Guardrail |

How Do We Use Value Engineering?

➤ Function - redirect traffic

➤ Idea - pile of dirt

➤ Justification - low cost and low maintenance

➤ Becomes a design standard

Summary of Past VE Savings
Federal-Aid Highway Program

SUMMARY OF PAST VE SAVINGS Federal-Aid Highway Program				
	FY 2001	**FY 2000**	**FY 1999**	**FY 1998**
Number of VE Studies	378	388	385	431
Cost of VE Studies Plus Administrative Costs	$7.29 M	$7.78 M	$7.47 M	$6.58 M
Estimated Construction Cost of Projects Studied	$18,882 M	$16,240 M	$18,837 M	$17,227 M
Total No. of Recommendations	2,013	2,017	2,082	2,003
Total Value of Recommendations	$2,375 M	$3,483 M	$3,226 M	$3,085 M
No. of Approved Recommendations	1017	1057	848	743
Value of Approved Recommendations	$865 M	$1,128 M	$846 M	$769 M
Return on Investment	119:1	145:1	113:1	117:1